Richardson WMA Oak Woodland
Habitat Restoration Project Summary
CE-RS-TS1

Location

Site: Richardson WMA
Towns: Brookfield and West Brookfield
District: Central

Project Area

176 Acres

MassWildlife's Approach to Habitat Management

MassWildlife uses habitat restoration and management to conserve both common wildlife and vulnerable species, including rare plants and animals protected by the Massachusetts Endangered Species Act (MESA) and other declining Species of Greatest Conservation Need (SGCN) identified in the Massachusetts State Wildlife Action Plan (SWAP). As part of this effort, biologists plan and implement projects to improve, restore, and maintain a variety of healthy habitats to increase biodiversity and climate resiliency across our forests, wetlands, streams, fields, and more.

Biologists plan habitat projects that may include tree cutting, mowing, and mulching to strategically increase open habitats, promote patches of vigorous young forest, restore natural processes, or remove invasive plants. This project has been designed to ensure consistency with recommendations for climate-oriented forest management provided by the Climate Forestry Committee (Climate Forestry Committee Report, 2024; see below).

Site Significance

Richardson Wildlife Management Area (WMA) encompasses 467 acres in the Quaboag River Valley and features mixed hardwood and conifer stands, fields, beaver impoundments, and shrub swamp habitat. The Quaboag River plays a vital role in the ecology of the region with its associated marshlands and upland oak woodlands. This project will complement ongoing habitat management across the river at Quaboag WMA, enhancing critical habitats along the protected corridor. Oak woodland restoration complimented with warm season grassland restoration will be implemented to develop high quality habitat.

Project Activities and Expected Outcomes

Tree harvest will be conducted on approximately 176 acres. Tree harvest will occur at varying intensities to stimulate understory growth. White pine and other generalist trees species will be removed to encourage oak woodland characteristics. Individual trees or clusters of trees with high habitat value, such as oak species, will be retained to provide food and/or winter cover to wildlife.

Once tree removal operations are complete, prescribed fire will be implemented to restore the site into an oak woodland system. The open oak woodland habitat will be maintained over time with periodic prescribed fire to promote the growth of fire-adapted shrubs and understory vegetation. It will also be complemented by prescribed fire management in the adjacent grasslands on site.

Project planning and oversight will be implemented by a team of experienced habitat biologists and restoration ecologists. It will take multiple years to complete project activities. This project will build on past successful habitat work in the Quaboag River Valley restoring oak woodland and warm season grassland habitats in and among the marshlands of the Quaboag River. This project will complement upcoming oak woodland restoration in the Long Hill section of the Quaboag WMA. Planned activities at both sites will develop open habitats and diversify the habitats currently available in the area.

Highlights:

- Removal of generalist species, including white pine, will promote the tree oak species growth and development of oak woodland characteristics.
- Tree cutting and the use of occasional prescribed fire for long-term habitat maintenance will promote the growth of understory vegetation, like scrub oak and lowbush blueberry, that will provide high-quality habitat for vulnerable and common insects and other types of wildlife.

Climate Considerations

This project was designed to ensure consistency with recommendations for climate-oriented forest management provided by the Climate Forestry Committee and includes:

- Thinning to restore open woodlands conditions to promote resilience to future drought and/or harmful insects;
- Restoring native species that are best adapted to the site to promote resilience to future drought and harmful insects;
- Prioritizing and maintaining at-risk species and habitats that are under pressure from climate change; and
- Restoring fire-influenced ecosystems that provide reliable carbon sinks in the long term compared to vulnerable fire-excluded forests.

See page 4 for more details.

Project Proposal Map

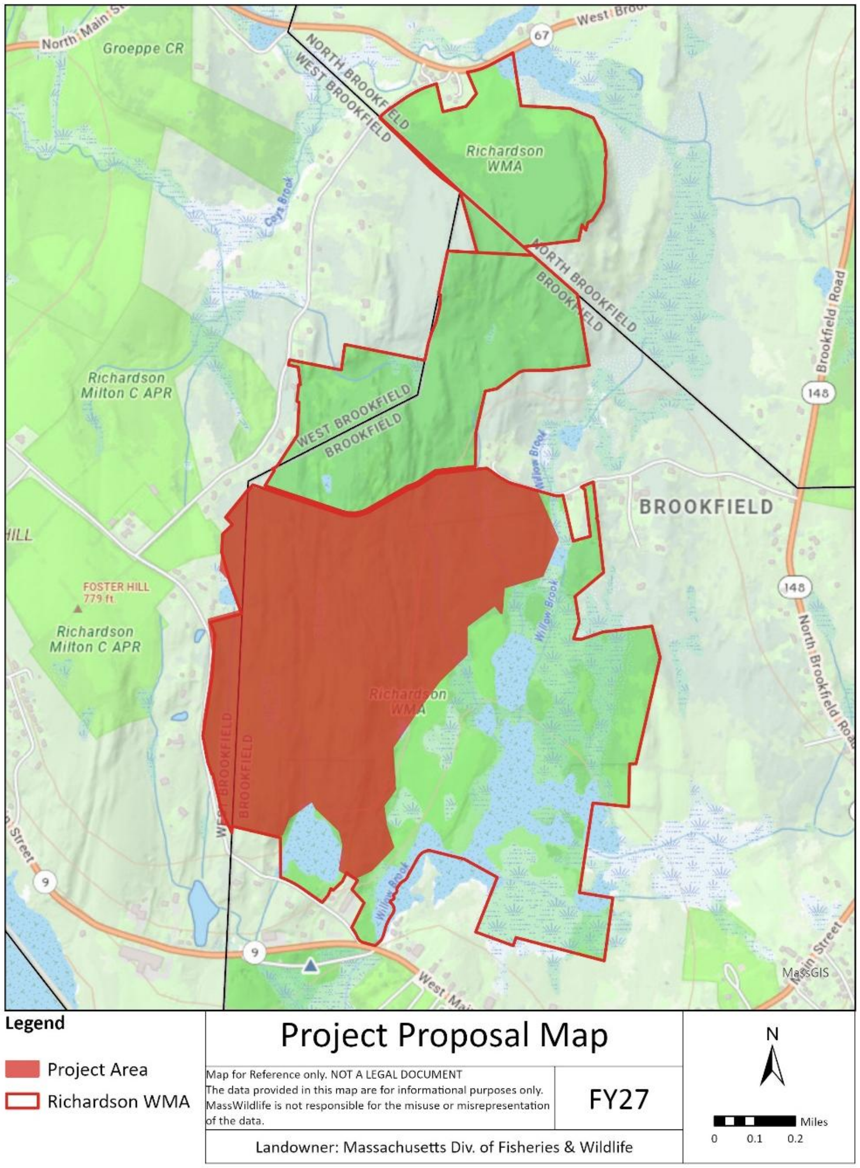

Figure 1. Map of Richardson WMA with highlighted project area

Climate Considerations Details

MassWildlife has determined that the decision to implement this project is consistent with EEA climate goals and guidelines and agency land management objectives. Carbon and climate change considerations specific to the activities proposed for this project are discussed below.

<table>
<tr><th>Management Activity</th><th>Alignment of Activity with Climate Oriented Strategies and Recommendations</th></tr>
<tr><td>Access improvements (landing improvements, gravel, road grading, ditch maintenance, road widening, straightening, and alteration of intersections).</td><td>Roads, landings, and associated infrastructure are critical for access by both the public and natural resource managers. These infrastructure elements are also associated with both vulnerabilities and opportunities in terms of climate change resiliency.
Vulnerabilities:
Roads occupy areas that would otherwise be carbon rich forest.
Road edges can become avenues for the spread of invasive species.
Roads have the potential for sediment transport into surface water resources.
Opportunities
A well-designed and well-maintained access system makes all other land management and monitoring activities possible while minimizing impacts.
Roads provide for public access including hiking, hunting fishing, etc.
Roads are critical for both Emergency Response (Injuries, Accidents, etc.) and Incident Stabilization (fire, flood, storm damage, etc.)
Given the predicted increase in storm frequency and intensity, improving and maintaining roads, road surfaces, and stormwater infrastructure is imperative.
Proper surfacing, grading, and ditching minimize erosion from stormwater and snowmelt.
Periodic maintenance is required to avoid water channelizing within compacted tire paths.
Adding gravel or other material to the road surface helps support the heavy vehicle traffic associated with forestry work, fire operations, and post-storm recovery efforts. Alterations (widening, straightening) are often needed to upgrade old, narrow farm lanes to meet modern vehicle access needs.
Ditching, cross culverts, and relief cuts can be designed with future storm intensities in mind and should minimize, to the greatest degree possible, impacts to surface water resources.
Most log landings are temporary in nature. Permanent landings that are properly located and well-built can serve as permanent access infrastructure, concentrating activities and minimizing the non-forested footprint required to conduct agency management. Whether temporary or permanent, the use, maintenance, and stabilization of landings will include considerations of future climate change impacts. Landing BMPs include:
Post-harvest stabilization measures such as grading and smoothing to prevent erosion and sedimentation.
Seeding to provide cover and further stabilize the soil.</td></tr>
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	• **Invasive plant survey and control** to minimize further infestation risks. • Periodic mowing of permanent landings to allow herbaceous and shrubby vegetation to dominate the site between harvests, adding **diverse habitat opportunities** for local wildlife.
Restore areas of significant soil disturbance or damage.	Significant soil disturbances can impact numerous soil properties including reduced **carbon stabilization**, increased compaction, reduced fertility due to mixing layers, increased erodibility, etc. Restoration activities may include: • Smoothing and installing water bars on firebreaks, especially those that are installed on slopes. • **Reforesting** ORV or logging access roads that are no longer needed and/or are redundant. • Correcting **erosion issues** associated with poor maintenance, poor drainage or water diversion infrastructure, loss of vegetation or topsoil (can occur on newly acquired properties), etc. Considerations for soil restoration activities: • Seedlings or saplings used need to be **protected from herbivory**. • Seeding should be done with **non-invasive and preferably native vegetation** and monitored for **invasive vegetation** during establishment. • **Future climate scenarios** such as increased rain and flooding. • Access control, especially unauthorized OHV/ORV activities. • Felling trees on-site to create barriers increases the pool of large, **downed, woody debris** while reducing the needs for **larger carbon footprint** devices like gates. • If earthwork or natural features are included as design elements, plan for access to perform routine maintenance.
Erosion and sedimentation control installation, including water bar installation and seeding landings and other disturbed areas.	Water bars help stabilize skid trails and ensure that **excessive erosion** is avoided while maintaining the site for future forestry operations. Properly stabilized skid trails will **revegetate** naturally while being discernable enough to use in future operations. Beyond compliance with the BMP manual standards, the size and frequency of water bar installation, and degree of stabilization, should be determined by: • **Other uses** that may occur between operations, e.g. hiking trails, snowmobiles trails, use as firebreaks, or unauthorized uses (OHV/ATV) • The **impacts of future climate conditions**, especially more frequent storms. If the area is already known to be wet, and in the future **more frequent storms are expected**, more water bars than what may be normally installed are encouraged. • **Soil type**. Land managers may consider seeding and mulching water bars on highly erodible soils, steep slopes, or excessively wet areas to ensure longevity and prevent water bar degradation.
Temporary stream or wetland crossing.	Temporary stream crossings are occasionally necessary to facilitate forest management activities, though careful project layout can help **minimize the number of stream crossings required**.

	• Crossing design, installation, maintenance, and removal should be done in accordance with the highest standard BMPs to minimize impacts to sensitive stream and wetland resources. • Plan for worst case **climate scenarios** that generally indicate a greater frequency of higher intensity precipitation events. • Changing **climatic conditions** change will require the continuous evaluation on the types of structures used.

TSI or similar young stand intervention/improvement.	Early intervention treatment within a young stand involves selecting healthy, vigorous, well-formed trees of desirable species and releasing them from competition by removing neighboring trees. Such work can have long-term positive impacts that **improve both tree and stand resiliency** in the face of climate change.
	• Deliberately shifting growing resources to the best trees early in stand development can result in more **carbon being stored on-site** at stand maturity.
	• Carefully planned and executed TSI activities can also **enhance the health and vigor of trees** that are important to the functioning of natural systems but may be **vulnerable to climate change** (e.g. pin cherry)**.**
	• This **very low impact** activity is unlikely to damage soils or spread invasive plants.
	• Allows for **full site occupancy**
	  ○ by superior growing stock,
	  ○ with little competition stress,
	  ○ quicker than would naturally occur,
	  ○ for much a longer period of time.
	• Early stand interventions can also assist in the **migration or transition of a climate adapted species**.

Invasive plant control, including pre- and/or post-harvest and follow up treatments.	Strong consensus exists among land managers and climate science experts regarding the **threat to future forest health** posed by the introduction and spread of invasive plants. **Invasive plants** can: • aggressively **outcompete native plant species,** • dominate understory communities, and even climb, kill, and topple mature trees, • threaten overall **biodiversity**. • threaten **soil health** and long-term **carbon storage**. **Monitoring and controlling** invasive and interfering plant populations prior to and following forestry operations is a critical practice for **minimizing the risk of further impacts** inadvertently (though not unexpectedly) spread by harvesting-related activities.
Habitat restoration and maintenance prescribed fires—heath, shrubland, woodland, or grassland.	Prescribed Fire is the planned use of fire in a particular place and time, under established conditions and safety requirements to accomplish resource management goals. • Prescribed fire improves habitat for a **variety of wildlife and native plants** and **restores natural communities** dependent on fire. • In fire-influenced natural communities, fragmentation of the landscape and the suppression of fires (prescribed or natural) leads to

	accumulation of volatile hazardous fuels in the surface, mid-story, and canopy vegetation layers. • Excessive vegetation density **negatively impacts the habitat quality** of the natural community and may eventually lead to fuel buildup and unplanned, catastrophic wildfire. • Prescribed fires that reflect natural return intervals increase below-ground **carbon storage and sequestration.** The consequences of **catastrophic wildfires** include: • The release of large amounts of **carbon** including **soil carbon**. • Tree mortality. • Severe soil, duff, and below ground vegetation impacts. • Potential alteration of soil chemistry. • Threats to firefighter safety, human communities, and property damage. • Threats to human health from severe smoke impacts both locally and potentially at long distances.
Full overstory removal, partial stand, variable retention harvesting	Variable retention (VR) is a regeneration technique based on natural disturbance ecology that retains important biodiversity components of the stand during the harvest to meet habitat objectives. The retained components include a diverse species mix of live and dead trees in a range of diameters with an emphasis on the larger sizes, cavity trees, and large snags and logs of different decay stages. These are in a patchwork pattern across the stand from single trees to large groups measured in acres. • This practice more closely **aligns with natural disturbance patterns**. • Promotion of a diversity of age classes, species composition and structural diversity **enhances overall forest resiliency**. • **More carbon is left on the landscape** for longer periods, in live trees, snags, and coarse woody material while regeneration develops. • **Improving conditions for a wide variety of local wildlife** through the creation of temporary young forest habitat. • Maintenance of continuous forest corridors provides for wildlife habitat connectivity. • As part of a regeneration system this method can be used to **help guide species diversity towards more future-adapted mixes.**
Full overstory removal, partial stand, patch regeneration cut.	Patch cutting is a regeneration technique that straddles the boundary between classic even-aged and uneven-aged forest management systems. Foresters select appropriate areas ('patches' or 'groups') covering a portion of the stand to harvest rather than removing the entire stand and then return periodically to repeat the process in other portions of the stand. In using patch cutting there is no final regeneration cut. Patch size and shape are determined by many different factors including overstory condition, desired species composition in the regeneration layer, other desirable herbaceous and woody vegetation, location, stand re-entry period, etc. Harvesting in patches aligns with many **climate-smart forestry practices**: • Increasing **structural diversity** improves resiliency by reducing the impact of age/size related disturbances. • Extending regeneration periods minimizes short term impacts to groundwater and nutrient cycling.

	• Partial stand overstory removals more closely align with **natural disturbance patterns**. • More **carbon is left on the landscape** for longer periods, and within-patch live tree, snag, and coarse debris retention allow for development of old forest characteristics. • Can also be used as opportunities to increase the stocking of **future climate adapted species, current climate imperiled species**, or other types of desirable vegetation.
Diffuse overstory removal, partial cut, habitat modification/maintenance.	Open **woodlands, savannas, barrens, and heathlands** are low tree-density, **fire-dependent** forests with diverse understory vegetation critical for conserving many state-listed rare species. They are **imperiled** across Massachusetts due to development and negative ecological alterations resulting from a lack of management primarily decades of fire exclusion. Climate experts recommend **prioritizing and maintaining sensitive or at-risk species and habitat**, with the expectation that pressure on these will only increase with changing climate. Ecological restoration of these sites ensures continued habitat function and reduces climatic vulnerability: • Reducing tree **density reduces vulnerability** to pests like southern pine beetle and to drought stress. • Restoring **native species** that are best adapted to the site **promotes resilience** to future drought, wildfire, and harmful insects. • Reintroducing low-intensity fire **promotes resilient native vegetation**. • Removing heavy fuel loads **reduces vulnerability to wildfire**. • Restoration better positions these sites **to adapt to climate change**. • Restored sites are **more reliable carbon sinks in the long term** than highly vulnerable dense fire-excluded forests. The agency recognizes that this site may store less carbon than denser forests in the short term. But climate models predict an increase in disturbance on these sites including drought, wildfire and range expansion of harmful insects that puts a dense fire suppressed forest at greater risk of becoming a carbon source in the long term. Projects like this are undertaken on Federal, state agency, and other conservation lands across the Commonwealth, under the guidance of collaborative teams consisting of biologists, restoration ecologists, foresters, and fire management professionals.
Diffuse overstory removal, partial cut, mid-rotation thinning.	Classic thinnings are partial cuts implemented during the 'middle years' of stand development ('intermediate treatments') to **adjust species composition**, shift growth towards desirable and more vigorous trees, and maintain desired density and stocking levels. Stands may be thinned multiple times prior to initiating the regeneration phase near the end of a planned rotation. Time intervals between thinnings are generally considerations between rotation lengths and the response of the trees on the site. Climate-smart practices that agency foresters keep in mind when conducting thinnings include: • **Retaining higher residual densities** that maintain higher levels of carbon stocks on the landscape. • Retaining better-formed and more vigorous individuals which will improve **carbon sequestration capacity**.

	• Taking the opportunity to favor **desired species**, especially those species that are better adapted to **future climate scenarios**.
Diffuse overstory removal, partial cut, late rotation regeneration related.	Partial cutting via single trees or small groups in a mature stand can advance a variety of management objectives as well as **climate-smart practices**. Single tree or very small group removals, if used exclusively and repeatedly, will perpetuate an **uneven-aged stand condition** with a species mix shifted towards higher shade tolerance. However, this type of harvest can also serve within an even-aged system to establish regeneration of species of lower shade tolerance under a partial canopy for subsequent release using larger group or patch cuts (irregular shelterwood) or complete-stand overstory removals. Advantages of partial overstory removals include, but not limited to: • Partial cutting **retains carbon on the landscape** for extended periods while regeneration develops. • Reducing competition for resources improves growth and **carbon sequestration** rates on residual trees. • Promotion of a diversity of age classes enhances overall forest **resiliency**. • Maintenance of continuous forest corridors provides for wildlife habitat. • As part of a regeneration system this method can be used to help guide species diversity towards more **future-adapted mixes**.